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PHILOSOPHICAL
TRANSACTIONS

OF THE

ROYAL SOCIETY

OF

LONDON.

FOR THE YEAR MDCCCLXII.

VOL. 152.—PART I.

LONDON:

PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

MDCCCLXII.

ADVERTISEMENT.

THE Committee appointed by the *Royal Society* to direct the publication of the *Philosophical Transactions*, take this opportunity to acquaint the Public, that it fully appears, as well from the Council-books and Journals of the Society, as from repeated declarations which have been made in several former *Transactions*, that the printing of them was always, from time to time, the single act of the respective Secretaries till the Forty-seventh Volume; the Society, as a Body, never interesting themselves any further in their publication, than by occasionally recommending the revival of them to some of their Secretaries, when, from the particular circumstances of their affairs, the *Transactions* had happened for any length of time to be intermitted. And this seems principally to have been done with a view to satisfy the Public, that their usual meetings were then continued, for the improvement of knowledge, and benefit of mankind, the great ends of their first institution by the Royal Charters, and which they have ever since steadily pursued.

But the Society being of late years greatly enlarged, and their communications more numerous, it was thought advisable that a Committee of their members should be appointed, to reconsider the papers read before them, and select out of them such as they should judge most proper for publication in the future *Transactions*; which was accordingly done upon the 26th of March 1752. And the grounds of their choice are, and will continue to be, the importance and singularity of the subjects, or the advantageous manner of treating them; without pretending to answer for the certainty of the facts, or propriety of the reasonings, contained in the several papers so published, which must still rest on the credit or judgement of their respective authors.

It is likewise necessary on this occasion to remark, that it is an established rule of the Society, to which they will always adhere, never to give their opinion, as a Body, upon any subject, either of Nature or Art, that comes before them. And therefore the

thanks, which are frequently proposed from the Chair, to be given to the authors of such papers as are read at their accustomed meetings, or to the persons through whose hands they received them, are to be considered in no other light than as a matter of civility, in return for the respect shown to the Society by those communications. The like also is to be said with regard to the several projects, inventions, and curiosities of various kinds, which are often exhibited to the Society; the authors whereof, or those who exhibit them, frequently take the liberty to report and even to certify in the public newspapers, that they have met with the highest applause and approbation. And therefore it is hoped that no regard will hereafter be paid to such reports and public notices; which in some instances have been too lightly credited, to the dishonour of the Society.

The Meteorological Journal hitherto kept by the Assistant Secretary at the Apartments of the Royal Society, by order of the President and Council, and published in the Philosophical Transactions, has been discontinued. The Government, on the recommendation of the President and Council, has established at the Royal Observatory at Greenwich, under the superintendence of the Astronomer Royal, a Magnetical and Meteorological Observatory, where observations are made on an extended scale, which are regularly published. These, which correspond with the grand scheme of observations now carrying out in different parts of the globe, supersede the necessity of a continuance of the observations made at the Apartments of the Royal Society, which could not be rendered so perfect as was desirable, on account of the imperfections of the locality and the multiplied duties of the observer.

A List of Public Institutions and Individuals, entitled to receive a copy of the Philosophical Transactions of each year, on making application for the same directly or through their respective agents, within five years of the date of publication.

Observatories.

Armagh.	Kew.
Cape of Good Hope.	Liverpool.
Dublin.	Madras.
Edinburgh.	Oxford (Radcliffe).
Greenwich.	

Institutions.

Barbadoes	Library and Museum.
Calcutta	Asiatic Society.
	Geological Museum.
Cambridge	Philosophical Society.
Cape Town	South African Library.
Dublin	Royal Dublin Society.
	Royal Irish Academy.
Edinburgh	Royal Society.
London	Admiralty Library.
	Chemical Society.
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	Royal Geographical Society.
	Royal Institution of Great Britain.
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	Society of Arts.
	The Treasury Library.
	United Service Museum.
	Zoological Society.
Malta	Public Library.
Manchester	Literary and Philosophical Society.
Oxford	Ashmolean Society.
	Radcliffe Library.
Swansea	Royal Institution.
Sydney	University Library.
Woolwich	Royal Artillery Library.

Belgium.

Brussels	Académie Royale de Médecine.
	Royal Academy of Sciences.

Denmark.

Altona	Royal Observatory.
Copenhagen . . .	Royal Society of Sciences.

France.

Montpellier . . .	Academy of Sciences.
Paris	Academy of Sciences.
	Dépôt de la Marine.
	Ecole des Mines.
	Geographical Society.
	Geological Society.
	Jardin des Plantes.
	Société d'Encouragement pour l'Industrie Nationale.
Toulouse	Academy of Sciences.

Germany.

Berlin	Royal Academy of Sciences.
	Society of Experimental Philosophy.
Jena	Cæsarean Acad. of Naturalists.
Frankfort	Natural History Society.
Giessen	University.
Göttingen	University.
Hamburg	Naturwissenschaftlicher-Verein.
Königsberg	Königlichen Physikalisch Ökonomischen Gesellschaft.
Leipzig	Royal Saxon Society of Sciences.
Mannheim	Observatory.
Munich	Royal Academy of Sciences.
Prague	Bohemian Society of Sciences.
Vienna	Imperial Academy of Sciences.
	Geologische Reichsanstalt.
Würzburg	Physico-Medical Society.

Hungary.

Pesth	Hungarian Academy of Sciences.
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Italy.

Catanea	Accademia Gioenia di Scienze Naturali.
Milan	Institute of Sciences, Letters and Arts.
Modena	Italian Society of Sciences.
Naples	Institute of Sciences.
Palermo	Academy of Sciences and Letters.
Rome	Academy de' Nuovi Lincei.
	Collegio Romano.
Turin	Royal Academy of Sciences.
Venice	Institute of Sciences, Letters, and Arts.

Java.

Batavia	Batavian Society of Sciences.
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Netherlands.

Amsterdam	Royal Institute.
Haarlem	Dutch Society of Sciences.
Rotterdam	Batavian Society of Experimental Philosophy.

Portugal.

Lisbon	Royal Academy of Sciences.
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Russia.

Kazan	Imperial University.
Moscow	Imperial Society of Naturalists.
Pulkowa	Observatory.
St. Petersburg . .	Imperial Academy of Sciences.

Spain.

Cadiz	Observatory.
Madrid	Royal Academy of Sciences.

Sweden and Norway.

Christiania	Royal University.
Drontheim	Royal Society of Sciences.
Gottenburg	Kongl. Vetenskaps och Vitterhets Samhälle.
Stockholm	Royal Academy of Sciences.

Switzerland.

Bern	Allg. Schweizerischen Gesellschaft.
Geneva	Société de Phys. et d'Hist. Naturelle.

Transylvania.

Klausenburg	Society of the Transylvanian Museum.
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United States.

Albany	New York State Library.
Boston	American Academy of Sciences.
Newhaven (Conn.)	The Editors of the American Journal.
Cambridge	Harvard University.
Philadelphia	Academy of Natural Sciences.
	American Philosophical Society.
Washington	Smithsonian Institution.
	Observatory.

A List of Public Institutions and Individuals, entitled to receive a copy of the Astronomical Observations (including Magnetism and Meteorology) made at the Royal Observatory at Greenwich, on making application for the same directly or through their respective agents, within two years of the date of publication.

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Altona.	Aberdeen University.
Armagh.	Berlin Academy.
Berlin.	Bologna Academy.
Breslau.	Boston American Academy of Sciences.
Brussels.	Brunswick, U.S. Bowdoin College.
Cadiz.	Cambridge Trinity College Library.
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Cape of Good Hope.	Dublin University.
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Copenhagen.	Royal Society.
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Dublin.	Göttingen University.
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Bonn	University.
Boston, U.S.	The Public Library (late Bowditch).
Cambridge	Philosophical Society.
Cherkow	University.
Falmouth	Royal Cornwall Poly- technic Society.
London	House of Lords, Library. House of Commons, Li- brary. King's College. Royal Society. University College, Li- brary.
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St. Bernard	Convent.
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Woolwich	Office of Mag. and Met. Publication.

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ERRATA.

Page 163, lines 2, 9, 13 (art. XLVII.), erase the word "non-polar."
 — — line 7, for because read when.

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ERRATA.

Page 588, line 10 from bottom, cancel p at the end of the formula, which should be

$$v \frac{Ct}{p} - \frac{1}{3} A.JK \left(\frac{273 \cdot 7}{t} \right)^2.$$

- 755, 7 lines from bottom, *for* Plate A. *read* Plate XXVII.
- 864, 8 lines from bottom of text, *for* fig. 2 *read* fig. 3.
- — 6 lines from bottom of text, *for* fig. 3 *read* fig. 2.
- 869, 13 lines from bottom of text, *for* more *read* less.

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ADJUDICATION of the MEDALS of the ROYAL SOCIETY for the year 1862 by
the PRESIDENT and COUNCIL.

The COPLEY MEDAL to THOMAS GRAHAM, Esq., F.R.S., for three Memoirs on the Diffusion of Liquids, published in the Philosophical Transactions for 1850 and 1851; for a Memoir on Osmotic Force in the Philosophical Transactions for 1854; and particularly for a Paper on Liquid Diffusion applied to Analysis, including a distinction of Compounds into Colloids and Crystalloids, published in the Philosophical Transactions for 1861.

The RUMFORD MEDAL to Professor KIRCHHOFF, of Heidelberg, for his Researches on the fixed Lines of the Solar Spectrum, and on the inversion of the bright lines in the Spectra of artificial light.

A ROYAL MEDAL to the Rev. Dr. T. R. ROBINSON, F.R.S., of Armagh, for the Armagh Catalogue of 5345 Stars, deduced from observations made at the Armagh Observatory, from the year 1826 up to 1854; for his Papers on the Construction of Astronomical Instruments, in the Memoirs of the Astronomical Society, and his Paper on Electro-Magnets, in the Transactions of the Royal Irish Academy.

A ROYAL MEDAL to Professor ALEXANDER W. WILLIAMSON, F.R.S., for his Researches on the Compound Ethers, and his subsequent communications in Organic Chemistry.

The BAKERIAN LECTURE was delivered by WARREN DE LA RUE, Esq., F.R.S.: it was entitled "On the Total Solar Eclipse of July 18th, 1860, observed at Rivabellosa, near Miranda de Ebro, in Spain."

The CROONIAN LECTURE was delivered by Professor A. KÖLLIKER, For. Memb. R.S.: it was entitled "On the Termination of Nerves in Muscles, as observed in the Frog; and on the Disposition of the Nerves in the Frog's Heart."

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ERRATA.

- Page 163, lines 2, 9, 13 (art. XLVII.), erase the word “non-polar.”
- — line 7, *for* because *read* when.
- 588, line 10 from bottom, cancel p at the end of the formula, which should be
- $$v \frac{Ct}{p} - \frac{1}{3} A J K \left(\frac{273 \cdot 7}{t} \right)^2.$$
- 755, 7 lines from bottom, *for* Plate A. *read* Plate XXVII.
- 864, 8 lines from bottom of text, *for* fig. 2 *read* fig. 3.
- — 6 lines from bottom of text, *for* fig. 3 *read* fig. 2.
- Page 869, 13 lines from bottom of text, *for* more *read* less.

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